

THE MOSQUITOES OF EGYPT, THE SUDAN AND ABYSSINIA

BY

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THE following paper is mainly based on the material collected by Dr. Andrew Balfour, Director of the Wellcome Research Laboratories, Khartoum, and to some extent by Captain Lyle Cummins, R.A.M.C., Dr. Keatinge, Major Ronald Ross, C.B., late I.M.S., and others. Many of the notes are those sent me by Dr. Andrew Balfour.

The specimens collected by the Director were mostly taken during a trip up the Blue Nile to Roseires, up the White Nile to Regaf in the Lado Enclave and up the Sobat and its two branches the Baro and the Pibor in Abyssinian territory.

As one might expect the regions traversed by the Nile and its tributaries are very prolific in regards to this group of Diptera. This is especially noticeable along the course of the Blue and White Niles, where in many parts the number of these pests is enormous. Not many species are yet known from this region, but it is almost certain that very many more exist.

The chief pests seem to be in the genera *Culex* and *Mansonia*, and amongst the Anophelina we find abundance of a *Cellia*, *C. pharænsis*, Theobald, and a *Myzomyia*, *M. funesta*, Giles. A new Anopheles (*A. wellcomei*) closely related to *Anopheles gigas*, Giles, from India is described and a new *Myzomyia* also some other Anophelines of considerable interest. The collection made by Dr. Balfour also contained a new *Uranotaenia* (*U. baljouri*) and at least one new genus (*Etorleptomysia*). Two strange males occurred in the collection, one undoubtedly the male of my genus *Mimomyia*. The other I cannot place in spite of its marked palpal character. I have merely described it without referring it to any definite position, as it was in too damaged a condition to show scale structure. The great number of *Mansonia uniformis*, Theobald, was the most noticeable feature during Dr. Balfour's trip. For other localities *vide* Dr. Balfour's list, which I have checked.

Many of the specimens showed the presence of a parasitic tick attached to them. When alive the parasite resembles a tiny preserved cherry, says Dr. Balfour. As a rule this parasite is attached to the under surface of the thorax and abdomen, but it was once found on the wing of an Anopheles. The colour varies in intensity.

PLATE I.



FIG. 1. *Myzomyia funesta*, Giles



FIG. 2. *Myzomyia funesta*, Giles



FIG. 3. *Myzomyia nili*, n. sp.



FIG. 4. *Myzomyia nili*, n. sp.



FIG. 5. *Anopheles wellcomei*, n. sp.



FIG. 6. *Anopheles wellcomei*, n. sp.



FIG. 7. *Mimomyia uniformis*, n. sp. ♀

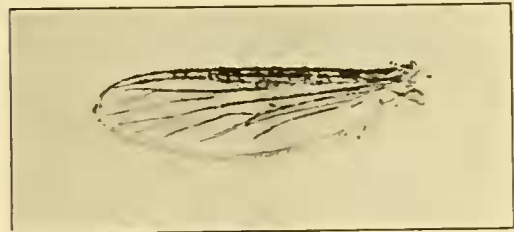


FIG. 8. *Mimomyia uniformis*, n. sp. ♀



FIG. 9. *Etorleptomyia mediolineata*, n. sp.

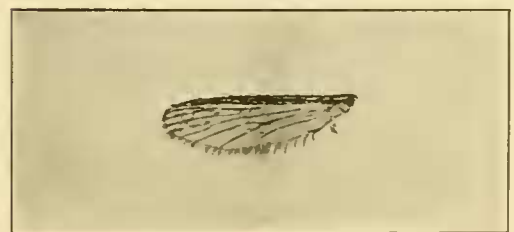


FIG. 10. *Mimomyia uniformis*, n. sp. ♂

Genus *ANOPHELES*, Meigen

Syst. Besch. I, 10 (1818), Meigen; Mono. Culicid. I., p. 115 (1901), Theobald, and III., p. 17 (1903).

Anopheles wellcomei, n. sp.

(Plates I., Figs. 5 & 6; III., Fig. 4. & V., Fig. 5)

Head black with dense white, yellow and brown upright forked scales, the white ones in front and two long hair-like projecting white tufts; palpi yellow, black at the base with two white bands on the yellow area. Thorax ashy, chestnut-brown at the sides and with hair-like golden scales; abdomen brown, unbanded with brownish-golden hairs. Wings mostly yellow scaled, costa jet black with two yellow spots and three or four black spots on the wing field.

Female. Head black densely clothed with large upright forked scales giving it a ragged appearance, white in front, yellow in the middle, black behind and at the sides; projecting forwards are two prominent tufts of long white hair-like scales; antennæ brown with pale hairs and the basal six or seven joints with many white scales, basal segment bright reddish-brown; proboscis with basal half black, apical half ochreous; palpi not quite as long as the proboscis, basal third black scaled, apical two-thirds bright ochreous with an almost white apical band and a pure white band about one-fourth the way down.

Thorax ashy-grey with a broad dark median stripe and chestnut-brown laterally, two more or less yellowish lines on the grey median area seen only in certain lights and under $\frac{2}{3}$ rd power, scales hair-like and pallid golden, except in front over the head, where there are grey and long narrow-curved scales; the hair-like scales form a prominent double row on each yellow line; scutellum and metanotum pale brown; pleuræ pale ochreous brown.

Abdomen brown, ochreous ventrally, with pale brown hairs, most dense on the venter.

Wings (Plate I., Figs. 5 & 6) with the costa jet black, with two prominent, rich yellow spots on the apical half; apex of wing yellow; first long vein yellow with a black spot near the apex under a small apical black costal spot, traces of two smaller ones nearer the base; subcostal black; second long vein yellow with a black spot on both branches of the fork-cell just under the black spot on the first long vein; third long vein all yellow, with a minute apical black spot and another minute one at its base just past the cross-veins; fourth long vein yellow with two dusky spots on the upper and one on the lower branches of the fork-cell, and a few on one side of its stem; fifth long vein yellow, a few black scales at the base of the upper branch, and a trace of an apical spot; sixth yellow with a black median spot; fringe black with yellow spots at the junction of all the veins, with the border and the greater part of the fringe from the sixth vein to the base yellow; first submarginal cell longer and narrower than the second posterior cell, its base nearer the base of the wing, its stem slightly more than half the length of the cell; stem of the second

PLATE II.

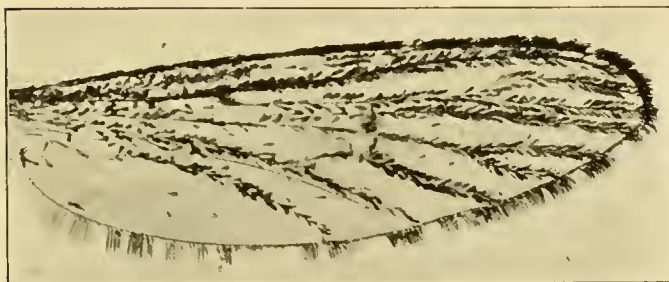


FIG. 1. *Mucidus africanus*, ♀ Theo.

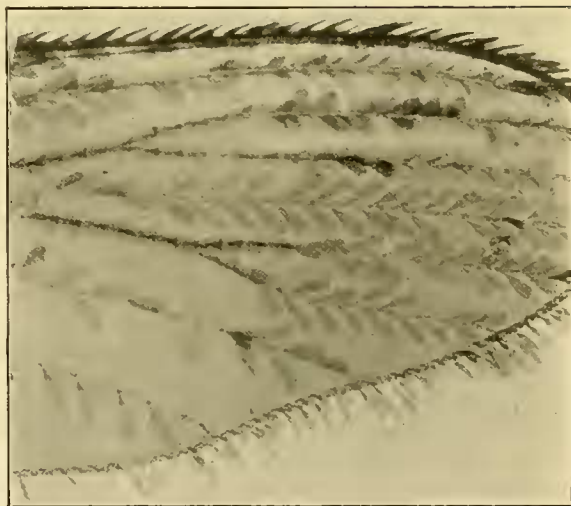


FIG. 2. *Etorleptomyia mediolineata*, ♀ n. sp.



FIG. 3. *Mansonia uniformis*, ♀ Theo.

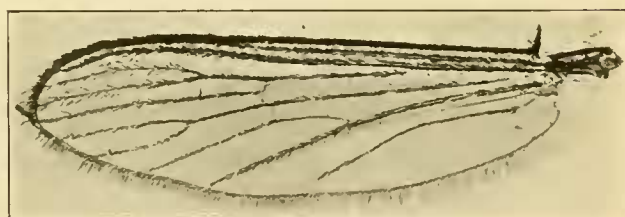


FIG. 4. *Culex dentatus*, ♀ n. sp.

posterior cell nearly as long as the cell; supernumerary and mid cross-veins in one line, posterior cross-vein about its own length distant behind the mid. Halteres with pale stem and fuscous knob.

Legs brown with very narrow apical yellow bands.

Length. 4.5 to 5 mm.

Habitat. Baro and Pibor.

Observations. Described from several females, but all have been slightly damaged, the wings are very characteristic and approach nearest to Giles's *Anopheles gigas* from India. Dr. Balfour states that "it boarded the steamer in the evening at Baro and bit freely."

There is variation in the wing marking especially in the size of the black spots on the wing field. It is abundant on the Baro.

Genus MYZOMYIA, Blanchard. (*Grassia*, Theobald.)

Comp. Rend. Heb. Soc. Biolog. No. 23, p. 795, Blanchard (*Myzomyia*) 1902; Journ. Trop. Med. V., p. 181, Theobald (*Grassia*), 1902; Mono. Culicid. III., p. 24, Theobald, 1903; Mem. X, Liverpool School Trop. Med. App. p. 4, (Varieties *umbrosa* and *subumbrosa*), Theobald (1903).

Myzomyia nili, n. sp.

(Plates I., Figs. 3 & 4; III., Fig. 2; V., Fig. 3)

Related to *Myzomyia funesta*, (Giles) but easily told by its much darker hue than in the dark varieties of *funesta*, by the palpi having one small apical pale band only and by the palpi and the proboscis being much shorter than the body.

Female. Head deep brown with grey upright forked-scales in the middle with a slight creamy hue, dusky ones at the sides, a creamy white tuft of hair and scales projecting forwards between the eyes; antennæ deep brown with brown hairs; palpi thin, as long as the proboscis covered with black scales, the apex only pale; clypeus black with a sulcus across the middle; proboscis thin and black, apex acuminate and testaceous with a few black hairs; proboscis and palpi not nearly as long as the body.

Thorax dull, pale fawn colour in the middle, dark brown at the sides, covered with scattered pale golden curved hair-like scales, a tuft of pale creamy narrow-curved ones in front projecting over the head; scutellum pale brown with many brown border-bristles; metanotum brown; pleuræ pale brown with a greenish tinge. Abdomen black with rich brown hairs.

Legs brown, unbanded, with small simple, equal unguis.

Wings (Plate I., Figs. 3 & 4) mainly black scaled, with three yellow costal spots spreading evenly on to the first long vein, all the veins dark scaled, except for a small yellow spot at the base of each of the two fork-cells, and at the cross-veins and another at the lower branch of the second fork-cell where it joins the costa and one on the costa where the lower branch of the

PLATE III.

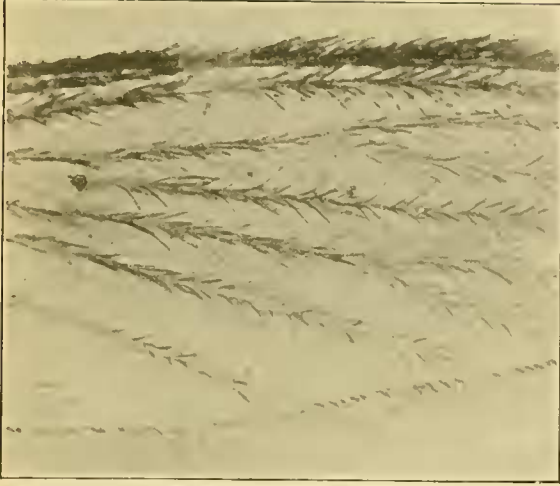


FIG. 1. *Myzomyia funesta*, Giles

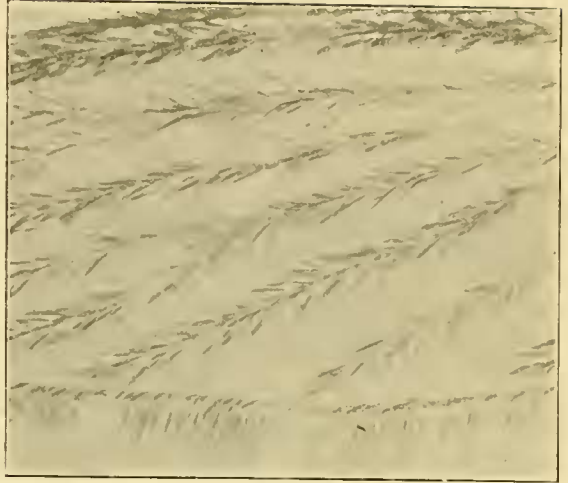


FIG. 2. *Myzomyia nili*, n. sp.

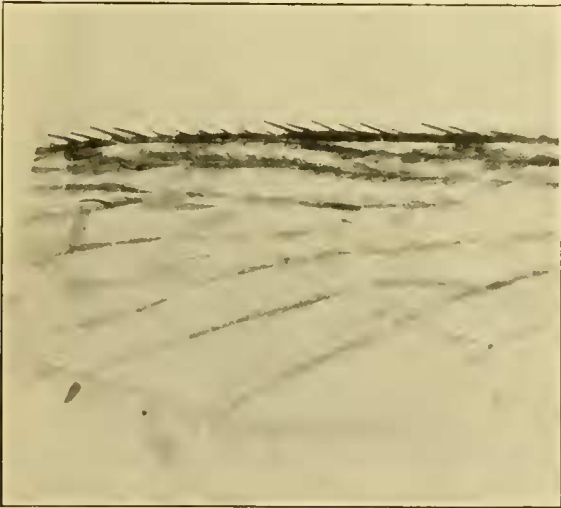


FIG. 3. *Mimomyia uniformis*, n. sp. ♀

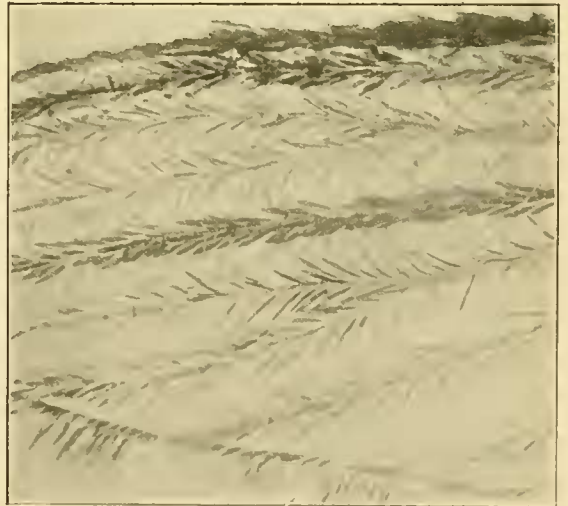


FIG. 4. *Anopheles wellcomei*, n. sp.

fifth joins it; fringe dark except where the lower branch of the fourth and fifth veins join the border where creamy patches occur; fork-cells both short, the base of the second posterior the nearer the base of the wing, both nearly equal in length, the first submarginal narrower than the second posterior, its stem as long as the cell, stem of the second posterior as long as the cell; supernumerary cross-vein slightly in front of the mid, the posterior nearly twice its own length distant from the mid. Halteres pale with fuscous knob.

Length. 3 mm.

Habitat. Jebel Akmet-Aga on the White Nile, also on the Middle Sobat.

Observations.—Described from two perfect females taken by Dr. Balfour. They bear a very strong resemblance to *Myzomyia funesta*, Giles, variety *umbrosa*. Theobald (vide Rept. Malaria Exp. to Gambia, Mem. X, Liv. School Trop. Med. App. p. 4, 1903). The main differences are as follows: the palpi and the proboscis are relatively not so long as in *M. funesta*, and they are all black save for a minute pale apical band, whilst in *funesta* there are three pale bands; the wings are much more densely scaled than in *funesta* and the fork-cells shorter and with much longer stems than in *funesta*. I thus think it must be treated as a distinct species owing to the shorter palpi and not as a melanic variety.

Myzomyia funesta, Giles

(Plates I., Figs. 1 & 2; III., Fig. 1, & V., Fig 2)

(Hand. Bk. Mosq., p. 162 (1902), Giles; Mono. Culicid. I., p. 178 (1901); III. p. 34 (1903).

This species has been sent by Dr. Balfour from the Sudan, and he states it is common on the Sobat, where he found it in numbers. The specimens sent were quite typical. I believe it occurs all over Central Africa down to Fashoda. The wing is figured on Plate I., Figs. 1 and 2.

Myzomyia n. sp.

A single much damaged *Myzomyia* was taken at Bor by Dr. Balfour, but it is too imperfect to describe, I am sure it is a new species however. Its marked feature is the pale grey ventral surface; the wings have only two yellow costal spots and a yellow apical spot which extends on to the first long vein, another pale spot towards the base of the first long vein, not reaching the costa and the base of the vein yellowish; a pale spot at the base of each fork-cell, another at the cross-veins and another at the marginal cross-vein; on the lower branch of the fifth a long yellow area and another faint one on the stem; fringe unspotted.

Length. 3 mm.

Anopheles (Myzomyia?) impunctus, Dönitz

(Beit. II., Kennt. d. Anop. (1902), p. 67; Mono. Culicid. III., p. 54 (1903).

This species is described by Dönitz from Lower Egypt (Wadi Natrun). I have not seen any species which answers to the figure of the wing which he gives.

PLATE IV.

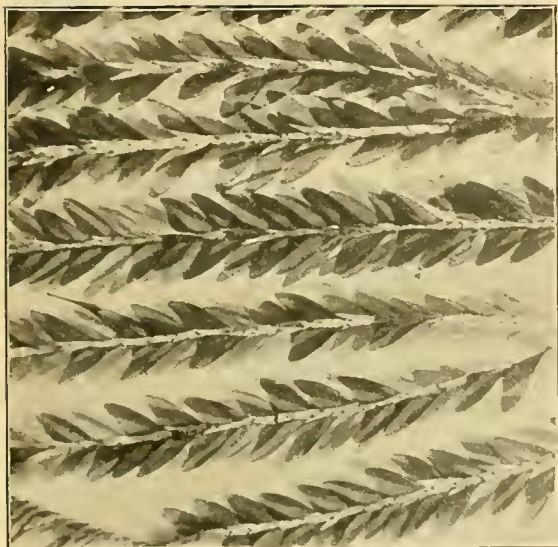


FIG. 1. *Mansonia uniformis*, Theo.

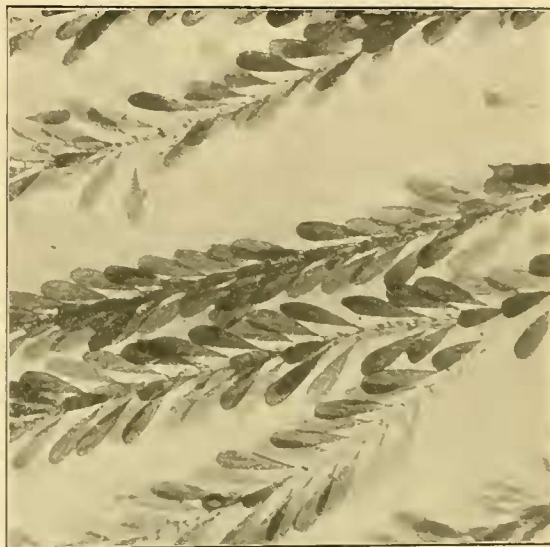


FIG. 2. *Mucidus africanus*, Theo.

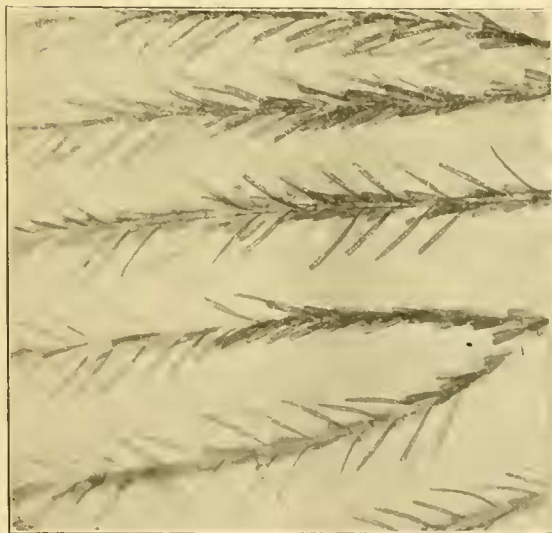


FIG. 3. *Culex dentatus*, n. sp.

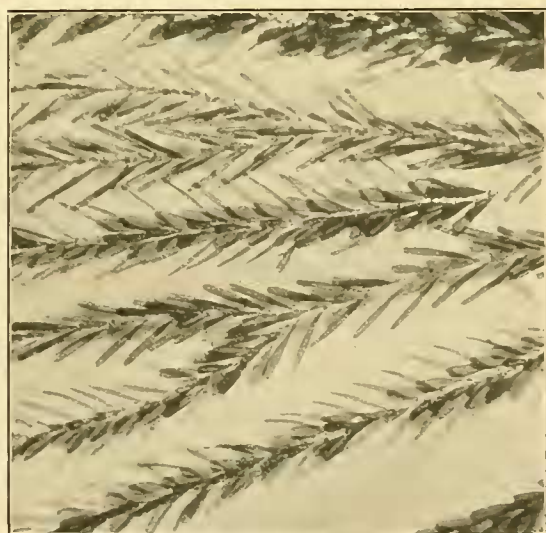


FIG. 4. *Taniorhynchus tenax*, Theo., var *maculipes*, n.v.

Genus PYRETOPHORUS, Blanchard (*Howardia*, Theobald)

Compt. Rend. Hebdom. Soc. d. Biol. No. 23, p. 795, Blanchard; Journ. Trop. Med. V., p. 181 (1902) Theobald; Mono. Culicid. III., p. 66, Theobald (1903).

Pyretophorus costalis, Loew.

{ *Anopheles costalis*, Loew.

{ *Anopheles gambia*, Giles.

{ *Anopheles gracilis*, Dönitz. (?)

(Plate V., Fig. 4)

Ent. Zeit. Berlin, p. 55 (1866), Loew; Handbook Gnats, 2nd Edition, p. 511, Giles (1902); Mono. Culicid. I., p. 157 (1901); and III., p. 74, Theobald (1903); Beit. z. Kennt. d. Anoph., p. 76, Dönitz (1902).

Found by Dr. Balfour at Senga and at Roseires, on the Blue Nile. I have not seen any specimens myself from Egypt or the Sudan, but I have had specimens from Uganda. It also occurs in Khartoum. This is a malaria carrier.

Genus MYZORHYNCHUS, Blanchard. (*Rossia*, Theobald).

Comp. Rend. Hebd. Soc. d. Biol. No. 23, p. 795 (1902). Journ. Trop. Med., p. 181 (1902), *Rossia*; Mono. Culicid. III., p. 84 (1903).

Myzorhynchus paludis, Theobald

Repts. Malarial. Comm. Royal Society England, p. 75 (1900); Mono. Culicid. I., p. 128 (1901), and III., p. 86 (1903).

Dr. Balfour obtained many on the Pibor (Bor and South of Goz-abu-Guma, White Nile) which showed no special peculiarities. He says they are very common there, but not very vicious. This species is much subject to the parasitic tick, often being covered with them. It is also probably a malaria bearer.

Previously, Captain Lyle Cummins obtained specimens from Bahr-El-Ghazal.

Genus CELLIA, Theobald

Mono. Culicid. III., p. 107 (1903)

Cellia pharansis, Theobald.

Anopheles pharansis, Theobald.

(Plate V., Fig. 1)

Mono. Culicid. Vol. I., p. 169, (1901), & Vol. III., p. 109 (1903)

Found by Dr. Balfour at Baro, also at Roseires on the Blue Nile (W. L. S. Loat and Dr. Balfour); Cairo (Keatinge); Ismailia (Ross).

This seems to be an abundant North and Central African species, and is undoubtedly a malaria bearer. It also extends into Arabia, having recently been sent me from the Aden hinterland, and it also occurs in Palestine.

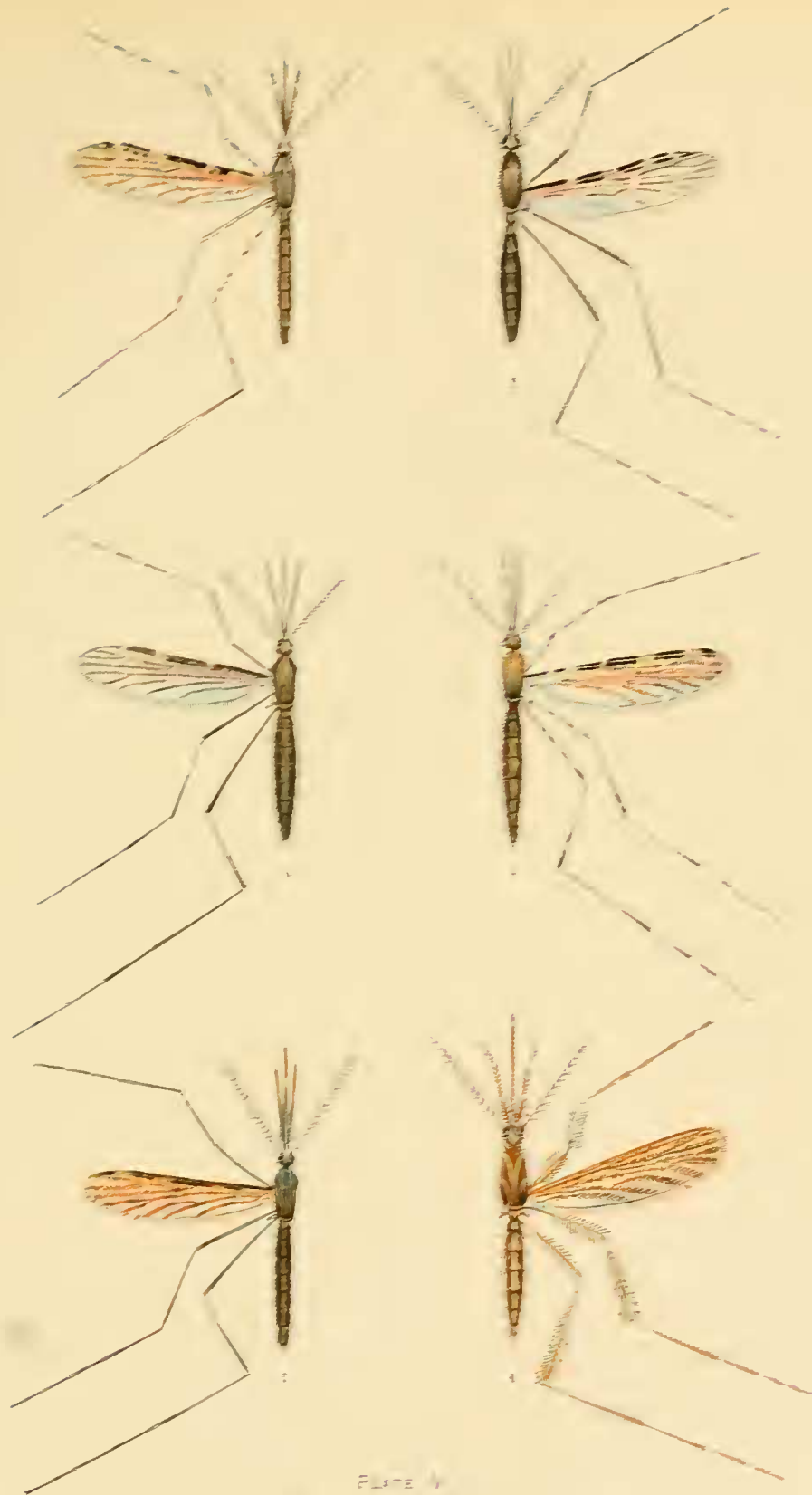


PLATE 4

SUDANESE MOSQUITOES

- | | |
|--|---|
| 1 <i>Culex</i> <i>sharpei</i> Theobald | 3 <i>Mansonia</i> <i>finlayi</i> Coquillett |
| 2 <i>Myzomelanus</i> <i>sp.</i> - sp. | 4 <i>Simulium</i> <i>sp.</i> - sp. |
| 5 <i>Anopheles</i> <i>sp.</i> - sp. | 6 <i>Mutisia</i> <i>sp.</i> - sp. |

(Contd.)

Genus MUCIDUS, Theobald.

Mono. Culicid. I., p. 268 (1901)

Mucidus africanus, Theobald.

Mono. Culicid. I., p. 274, and III., p. 134 (1903).

(Plates II., Fig. 1; IV., Fig. 2; V., Fig. 6)

A single female was sent by Colonel Stanton to Dr. Balfour, taken in Khartoum. It is undoubtedly a variety of my *M. africanus*. Dr. Balfour describes in his notes the cross-veins as being like a *Culex*. I have mounted the wings of the specimen he sent, and find them quite normal. I may here point out a character I have missed in this genus, namely, that the third long vein is very near the second (*vide* photo of wing, Plate II., Fig. 1). It has also occurred in Uganda. (Wadelai, one female.)

Genus STEGOMYIA, Theobald

Mono. Culicid. I., p. 283 (1901)

Stegomyia fasciata, Fabricius.

(Plate VI., Fig. 2)

Syst. Antl. 36, 13 (1805) Fabr.: Mono. Culicid. I., p. 289 (1901) and III., p. 141 (1903).

This yellow fever carrier has been taken at Ismailia and Port Said by Major Ronald Ross, and it also occurs in Khartoum and on the river steamers. Other localities Pibor, Cairo.

Genus ETORLEPTIOMYIA, nov. gen.

Head clothed with a mixture of narrow-curved scales, upright forked ones and small loose flat scales all over; antennæ scaly on the basal joints. Thorax with scales of mesonotum narrow and curved, those of the scutellum flat and small. Abdomen clothed with flat scales. Wings with very marked heart-shaped scales (Plate II., Fig. 2), on the basal halves of the second, fourth, fifth and sixth veins; on the first long vein, base of second and fourth also with more or less *Mansonia*-like scales and along costal border also, scales on the apical halves of the veins pedunculated, clavate, peduncles very short; costa spiny; fork-cells moderately long.

This forms a very distinct genus, easily told by the curious heart-shaped scales on the wings. The proboscis seems very weak.

A single species only is so far known, which was taken by Dr. Balfour. The *Mansonia*-like scales are not exactly as in that genus, but approach them very closely.

Etorleptiomyia mediolineata, n. sp.

Head yellow with a black patch on each side; proboscis brown, unbanded. Thorax black with narrow-curved golden scales. Abdomen black with a median line of yellow scales. Legs brown, femora yellow beneath, tibiae mottled with yellow, metatarsi and tarsi with yellow apical bands except the last. Wings with dark brown scales basally and along the costal area.

Female. Head brown, clothed with creamy yellow scales in the middle and around the eyes, black at the sides, the scales behind and in the middle are narrow-curved ones and they extend through to the front, and scattered between the loose flat paler yellow ones which form most of the median area; flat black scales at the sides, those round the eyes pale yellow, fork-scales black on the dark area, ochreous in the middle yellow area; the yellow fork-scales have three terminal spines, the black four or five. Palpi densely black scaled, short; proboscis weak and thin, clothed with small black scales,

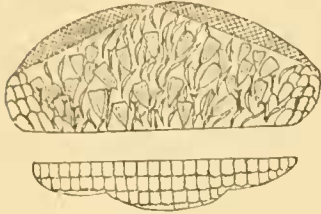


FIG. 1
Cephalic and scutellar ornamentation of
Etorleptomyia mediolineata

the yellowish ground color showing through; antennæ deep brown, basal joint and next two following with small flat creamy scales.

Thorax black with narrow-curved golden scales and a few bronzy ones behind; scutellum with small flat black scales, mid lobe with five posterior border-bristles; metanotum deep brown with a median paler line; pleuræ pale ochreous. Abdomen black with a median line of creamy yellow scales, rather broadest at the base.

Legs with yellow coxae, femora yellow with blackish scales above, and two pale spots, yellow below; the fore femora appear much paler than the mid and hind; tibiæ black with scattered yellow scales and small yellow apex; metatarsi yellow at the base, and apex, and with a more or less pronounced yellow median band; first two tarsi on all the legs with an apical yellow band, last two all brown; ungues small, equal and simple.

Wings (Plate I., Fig. 9 and Plate II., Fig. 2), with dark scales basally and some spread out towards the apex along the costal border and another slightly dark area on the first fork-cell; scales on the first long vein, upper branch of first fork-cell, and one side of the base of the fourth, of *Mansonia* type; the second, fourth, fifth and sixth with characteristic single line of heart-shaped scales on the major area, on most of the branches of the fourth and fifth are clavate scales, with very short peduncles; a few heart-shaped ones at the base of the cells; costa spiny; first submarginal cell longer and slightly narrower than the second posterior cell, its base nearer the base of the wing, its stem short, about one-fifth the length of the cell; stem of the second posterior not quite half

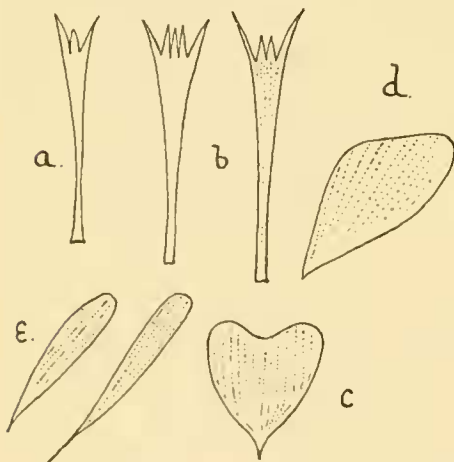


FIG. 2
Scales of *Etorleptomyia mediolineata*
a & b Upright forked scales
c Heart-shaped wing scale
d *Mansonia* scales of costal border
e Other wing scales

the length of the cell; posterior cross-vein about twice its own length distant from the mid.

Length. 3 mm.

Habitat. Pibor.

Observations. Described from a single perfect female. Dr. Balfour sends the following notes regarding it which show that differences of colour exist between fresh and dried specimens:—"proboscis brownish yellow with a purple or black band or tuft near the labellæ. Thorax, ground colour purple. Abdomen purple with median line of pale scales and two yellowish lateral patches on the last segment." There may be a minute tooth on each fore unguis, but I do not think so; the mid and hind are anyway equal and simple. The differences in color between the areas of the wing are very marked.

Genus THEOBALDIA, Neveu-Lemaire

Compt. Rendus. d. Seas. d. la. Soc. d. Biol., 29 Nov. (1902). (Neveu-Lemaire); Mono. Culicid. III., p. 148. Theobald (1903).

Theobaldia spathipalpis, Rondani

Culex spathipalpis, Rondani

(Plate VI., Fig. 1)

Dipt. Ital. Prodro. I. (1886), Rondani; Mono. Culicid I., p. 339 (1901), and III., p. 154 (1903), Theobald.

Adults, larvæ and pupæ of this species, have been sent me by Dr. Balfour from Khartoum North. Both male and female are somewhat pallid, but the thoracic ornamentation is very marked, the wing spots paler than in most specimens, almost absent.

Genus CULEX, Linnaeus

Linn. Syst. Nat. (1735); Mono. Culicid. I., p. 326 (1901)

Culex viridis, Theobald

Mono. Culicid. III., p. 212 (1903)

This is apparently a widely distributed African species, being especially abundant in Central Africa. I originally described it from Uganda specimens. It varies much in size; some sent by Dr. Balfour being 3.5 mm. only, others 4.5 mm. Dr. Balfour collected it from the Sobat, Baro, Pibor, Lado.

The specimens show considerable variation in regards to the length of the fork-cells, position of the cross-veins and size.

Dr. Balfour mentions in regard to one specimen that the "legs were rich reddish-brown." They are dull brown in the dried specimens.

The lateral abdominal spots also vary, usually basal, but some are found to be central and others apical, yet others where the spot spreads all along the side of the segment. It is the only species so far found in Central and West Africa with an unbanded abdomen, otherwise it looks much like *C. fatigans*. The Sudanese specimens do not show so clearly the greenish pleuræ seen in Uganda specimens.

Culex pallidocephala, n. sp.

Somewhat like *C. fatigans* but the head with rather dense, pale, narrow-curved scales and numerous dark brown to black upright-forked ones. Palpi and

proboscis black. Thorax dark brown ornamented with brown and golden brown narrow-curved scales, the golden brown forming more or less distinct linear ornamentation and a curved line on each side in front of the wings, which surrounds a dark area in front of each wing. Abdomen black with basal creamy bands. Legs brown unbanded.

Female. Head brown, clothed with rather dense pale narrow-curved scales which lie uniformly pointing forwards, a few still paler very small flat scales laterally and long thin bifid upright forked-scales over the greater part, those placed laterally jet black, those in the median area dark brown to yellowish-brown according to the rays of light; palpi thick, three distinct small basal segments dull testaceous, the fat apical segment as long as the three basal ones and black scaled; there may be a minute nipple-like apical segment, but if so it is hidden in scales; proboscis and clypeus deep brown.

Thorax dark brown, ornamented with dull golden and deep rich brown narrow-curved scales; the dark scales form two prominent oval areas, one in front of the base of each wing, the dull golden scales bordering them: the latter are also more or less placed in lines along the middle of the thorax and others at the sides above the pleuræ, others, almost creamy, in front of the scutellum; scutellum paler brown than the mesonotum, with pale narrow-curved scales and black border-bristles, seven to the mid lobe; metanotum black; pleuræ black with three patches of white scales.

Abdomen black with black scales and creamy basal bands, the last two spreading out laterally; venter all creamy yellow.

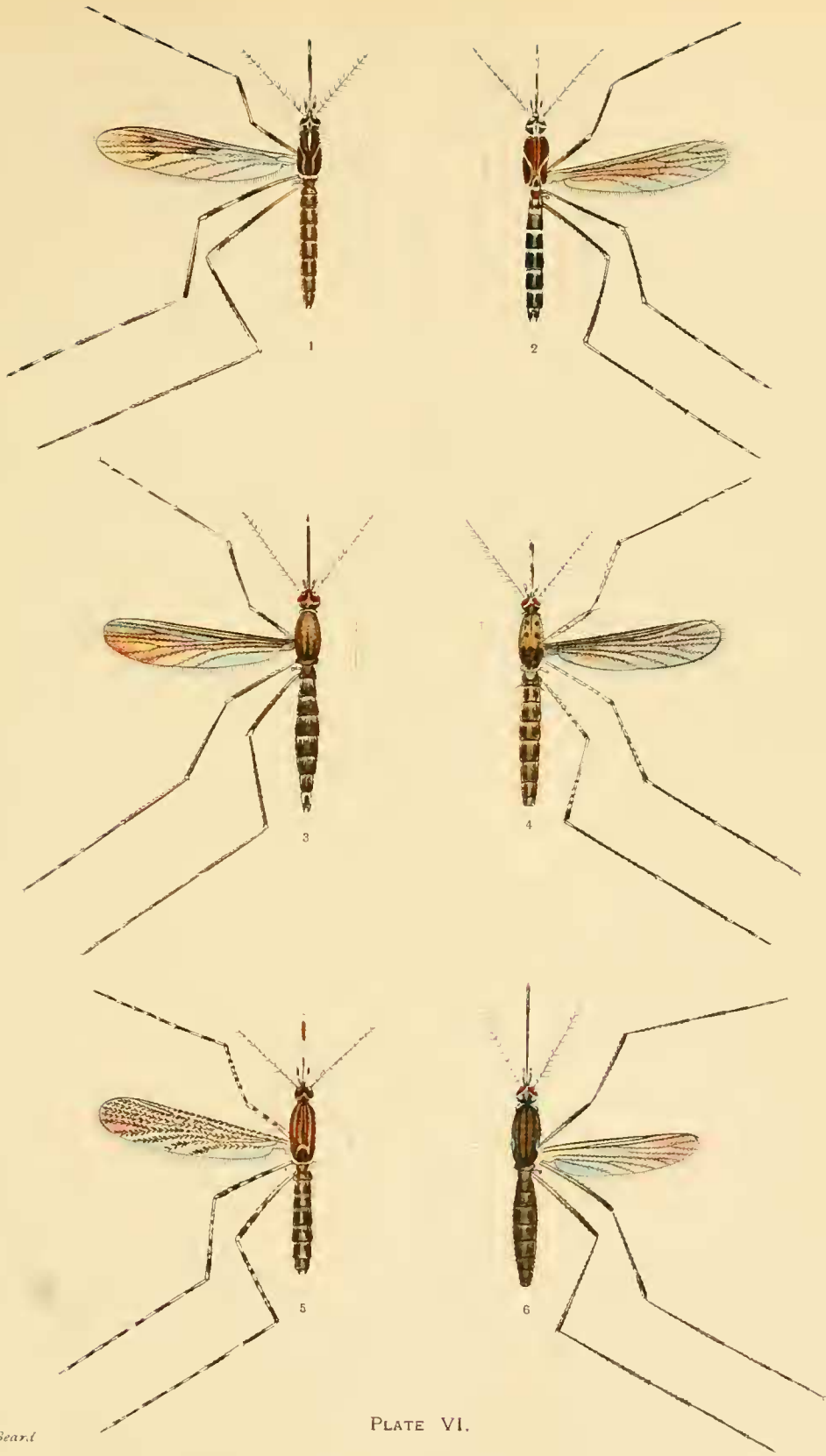
Legs deep brown, unbanded, traces of a pale knee spot and a creamy apical spot on the hind tibiæ.

Wings with typical brown *Culex* scales: the first sub-marginal cell considerably longer and slightly narrower than the second posterior cell, its base much nearer the base of the wing than that of the latter, its stem short, rather less than one-fourth the length of the cell; stem of the second posterior about two-thirds the length of the cell; posterior cross-vein rather more than its own length distant behind the mid cross-vein; halteres with reddish-brown stem, fuscous knob with a few grey scales.

Length. 4.5 mm.

Habitat. Senmar, Blue Nile.

Observations.—Described from a single female. It resembles at first sight *C. fatigans* but the paler scaled head and the numerous long upright forked-scales separate it, the thorax too is distinctly ornamented, the two dark ocellate areas being most noticeable. The palpi may be five-jointed, but are heavily scaled so that a small apical segment cannot be seen, the three small basal segments are very distinct. The last tarsals are gone so that the characters of the ungues cannot be given.



C. Beard

PLATE VI.

SUDANESE MOSQUITOES

- | | | | |
|---|--|---|--|
| 1 | <i>Theobaldia spathipalpis</i> , Rondani | 2 | <i>Stegomyia fasciata</i> , Fabricius |
| 3 | <i>Culex dentatus</i> , n. sp. | 4 | <i>Tæniorhynchus tenax</i> var. <i>maculipes</i> n. var. |
| 5 | <i>Mansonia uniformis</i> , Theobald | 6 | <i>Uranotænia balfouri</i> , n. sp. |

Culex cumminsii, Theobald
Mono. Culicid. III., p. 214, (1903)

This large mosquito was taken first by Capt. Cummins in the Bahr-El-Ghazal and subsequently by Drs. Moffat and Low in Uganda. From a note sent me by Dr. Balfour I fancy it also occurs in Khartoum.

It is a large handsome gnat with deep brown thorax clothed with narrow hair-like golden scales and white scaled pleuræ; deep brown unbanded abdomen with prominent white lateral basal spots. Unbanded legs and brown palpi and proboscis. Length 7 mm.

Culex dentatus, n. sp.

(Plates II., Fig. 4; IV., Fig. 3; VI., Fig. 3)

Head dark brown with some narrow-curved golden scales, a golden yellow border around the eyes and a pale patch on each side. Thorax deep brown, ornamented with rich golden-brown and golden narrow-curved and hair-like scales showing more or less linear arrangement. Abdomen deep brown with basal pale bands and basal creamy lateral spots, venter creamy scaled. Palpi, proboscis and legs uniformly brown, except the venter of the femora which are pale, and there is a yellow apical tibial spot; ungues large, equal, uniserrated.

Female. Head dark brown, almost black, clothed behind and over most of the mid area with large narrow-curved pale golden scales, almost creamy yellow in some lights and with a frontal median patch of much smaller golden-brown ones, around the eyes thin narrow-curved pale creamy scales and flat pale creamy lateral ones: upright forked-scales not much expanded apically, scanty and dark brown; a pale yellow tuft projects beneath the eyes; palpi thick, deep brown or black, with long black bristles; proboscis deep black; antennæ deep brown, basal segment and base of the second segment testaceous, the former darker on the inner side with a few creamy scales. Thorax deep brown clothed with curved hair-like golden-brown and golden scales, the golden scales forming two rather indistinct median parallel lines and a curved lateral line on each side behind with a more or less darkened area outside it, before the scutellum the scales are paler and of normal curved form; scutellum brown with narrow-curved pale golden scales and brown border-bristles, seven to the mid lobe; metanotum brown; pleuræ black with patches of creamy scales.

Abdomen black with basal creamy scaled bands and lateral spots, venter mostly creamy scaled; on the apical segment the creamy lateral spots join the basal band and look like extensions of it down the sides.

Legs brown, unbanded, but the femora are pale ventrally, and there are yellow knee spots and traces of apical yellow tibial spots; ungues all equal, thick and with a thick tooth.

Wings (Plate II., Fig. 4) large and broad, scales of typical *Culex* form (Plate IV., Fig. 3); first submarginal cell longer and narrower than the second posterior cell, its base nearer the base of the wing than that of the second posterior cell, its stem a little more than one-third the length of the cell;

posterior cross-vein about half its length distant from the mid cross-vein: halteres with pale stem and creamy scaled knob.

Length. 5 to 5.5 mm.

Habitat. Abyssinia (Isana, through Damot).

Observations. Described from four females. It is a large heavy built *Culex*, very like a large *C. fatigans*, Wied., but can at once be told by the dentate unguis. The thoracic ornamentation is marked in some very clearly, in others not so much.

A specimen sent by Dr. Balfour from the Sobat in very damaged condition seemed to be this species.

Culex fatigans, Wiedemann

Auss. Zwei. Ins. p. 10 (1828), Wied. Mono. Culicid. II., p. 151

(1901), Theobald. Mono. Culicid. III., p. 225 (1903), Theobald

Apparently very abundant along the Nile and its tributaries as elsewhere. Dr. Balfour has taken it on the Baro and Pibor, and reports it as by far the commonest mosquito in Khartoum. I have also seen specimens from Suez, Ismailia, and Cairo.

Culex pusillus, Bigot

Dipt. Exot. 4th Supp., p. 9, Mono. Culicid. II., p. 166 (1901)

This small thick set *Culex* has not occurred since Bigot's specimens were taken. It is evidently distinct, and comes between *Culex pipiens* and *C. fatigans*.

Culex pipiens, Linnaeus

Fu. Succ. (1758), Linnaeus; Mono. Culicid. II., p. 132 (1901), and
III., 224 (1903)

Recorded by Dr. Keatinge from Cairo, and from Suez by Col. Giles, late I.M.S. Also from Port Said and Ismailia (Major Ronald Ross, C.B.).

Genus *MANSONIA*, Blanchard

Panoplites, Theobald

Comp. Rend. Hebd. Soc. d. Biol., No. 37, T. liii., p. 1046 (1901)

Mono. Culicid. II., p. 173 (1901)

Mansonia uniformis, Theobald.

{*Panoplites uniformis*, Theobald.

{*Panoplites africanus*, Theobald.

(Plates II., Fig. 3: IV., Fig. 1: VI., Fig. 5)

Mono. Culicid. II., p. 180 (*uniformis*), p. 187 (*africanus*), 1901;

III., p. 273 (1903)

Specimens were taken at the following places:—Middle Sobat, Pibor River, Renk, and Kenissa by Dr. Balfour. Bahr-El-Ghazal (Cummins).

Probably occurs all over Egypt and the Sudan.

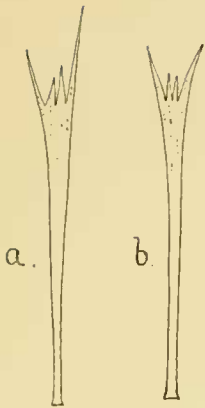


FIG. 3
Upright forked scales of
a *Mansonia major*
b *Mansonia uniformis*

The specimens show great variation in size. The large ones look very like *Mansonia major*, Theobald (Mono. Culicid. III, p. 270) but the forked cephalic scales have mostly only one median spine, but may have two as in *M. major*, but the lateral spines are equal not unequal. This character I neglected to point out before. For figures of wing, *vide* Plate II., Fig. 3, and Plate IV., Fig. 1.

Dr. Balfour writes that this species "becomes common and remains so shortly after passing Wad Medani on the way South."

It is widely distributed over Central, Northern, East and Western Africa, and also in India and the Philippine Islands. I have had none from the Transvaal, Orange River Colony or Cape Colony.

Mansonia major, Theobald

Mono. Culicid. III, p. 270 (1903)

No fresh specimens have been received since the one sent me by Capt. Cummins taken in the Bahr-El-Ghazal.

It is larger than the largest of the preceding species reaching 6.5mm. in length. It can be told by the upright forked cephalic scales having the thin lateral spines unequal and by their irregular form and the "border scales" on the wing being all dull yellow whilst in *M. uniformis* they are in alternating patches of dull yellow and black.

Genus *Tæniorhynchus*, Arribalzaga

Dipt. Argentina, p. 47 (1899); Mono. Culicid. II, p. 190 (1901)

Tæniorhynchus aurites, Theobald

Mono. Culicid. II, p. 209 (1901) and III, p. 269, (1903).

This species occurs in fair numbers on both the Blue and White Niles. Dr. Balfour took them between Roseires and Sennar on the Blue Nile, at Bahr-El-Jebel North Sudd country on the White Nile

It also occurs in Uganda and on the West Coast at Bonny and in the Federated Malay States.

Tæniorhynchus annettii, Theobald

Mono. Culicid. II, p. 205 (1901)

A single female with body gorged with blood and denuded of scales thus appearing black. The sixth dusky scaled long vein is prominent and clearly defines it from the former species.

Taken at Lake No, White Nile. Dr. Balfour adds a note "femora spotted black," I cannot detect the spotting in the specimen he sends. This beautiful species has also been taken in Old Calabar.

Teniorhynchus cristatus, n. sp.

Thorax shiny black, with golden hair-like curved scales. Abdomen orange. Legs black and orange, with tufts of black scales especially on the middle of the hind tibiae.

Female. Head brown, with pale yellow narrow-curved scales, and long, black, bifid, upright, forked-scales over the occiput, and a tuft of stout brown bristles projecting forwards; antennae brown, the four basal segments reddish. Proboscis and palpi yellowish, with black apices.

Thorax black with narrow hair-like curved golden scales, pleurae with a few white patches; on the mesonotum lateral rows of long stout black bristles; scutellum black, with hair-like golden scales and black border-bristles.

Abdomen entirely orange with orange-yellow scales, above and below. Legs yellow, with black tufts, very inconspicuous on the forelegs, more like banding at the femoro-tibial and tibio-metatarsal joints; the second pair the same, but more marked, femur spotted with black, the last segment of tarsus black; the hind legs similar to the mid, but with bright purple to black tufts in the middle of the tibiae, consisting both of scales and bristles; apical half of the metatarsus black; nearly two-thirds of the apical half of the first tarsal and the second tarsal black, last tarsal black with yellow basal band at the joint; ungues of fore and mid legs long, equal and simple, of the hind small, equal, and simple.

Wings with yellow costa and veins, and yellow and dark scales, the yellow scales more rounded at the apex than the dark ones, some slightly expanded; most of the dusky scales are acutely truncated. First sub-marginal cell very long, longer than the second posterior cell; fringe dark. Halteres pale yellow, with pale knobs.

Length. 6 mm.

Habitat. Pibor.

Observations.—A single specimen only taken. The description is mainly that sent me by Dr. Balfour; the type was much damaged in transit, but I have added a few notes to those he has sent me. It is certainly a new species, easily identified by the tuft of purple-black scales and bristles on the hind legs.

Teniorhynchus tenax, Theobald

Mono. Culicid. II., 198 (1901), and III., 258 (1903)

Male. Thorax as in the female; palpi black with five yellowish bands, one apical, the two apical segments of nearly equal length, with black hairs on both sides, the antipenultimate segment with black hairs on the outside, the fifth (basal band) is small; antennae banded black and white with blackish hairs. Abdomen with basal pale bands which spread out laterally on the basal segments. Wings with the fork-cells and their stems short; the first submarginal cell longer and narrower than the second posterior, its stem about half the length of the cell, stem of the second posterior less than half the length of the cell. Legs as

in the female; fore and mid unguis unequal, the larger uniserrated, the smaller also with a basal tooth, hind equal and simple.

Length. 5 mm.

Habitat. Middle and Lower Sobat; Sennar, Blue Nile; Jebelein, White Nile; Fashoda; Kenissa; Baro; Pibor. This species is very common on both Niles.

Observations. Dr. Balfour adds a note as follows:—"Band on the proboscis narrower and paler than in the female. There are marked white basal abdominal bands. The white scales on the second segment are arranged like the letter V: abdomen has also white lateral spots."

Besides the male, which has not been previously described, several females have been sent me by Dr. Balfour. The anterior thoracic ornamentation is not as pronounced as in the type, but where the pale scaled area joins the dark it is just the same; the abdomen is not so speckled on the posterior segments.

Taniorhynchus tenax Theobald
var *maculipes*, n. v.

(Plates IV., Fig. 4; VI., Fig. 4)

Very similar to the type, but with the femora and tibiae of all three pairs of legs with a row of clear white spots on one side.

The banding of the legs passes slightly on to the apices of the preceding segments above, forming apical pale spots. The tibiae and to some extent the



FIG. 4

Wing of *Taniorhynchus tenax* Theo.
var *maculipes*, n. v.

femora have black bristles. The wings (Fig. 4) resemble the type, but there is some variation in the relative lengths of the fork-cells and their stems; in the type of this variety the first sub-marginal is considerably longer and narrower than the second posterior cell, its stem less than one half the length

of the cell, its base nearer the base of the wing than that of the second posterior; stem of the second posterior half the length of the cell; posterior cross-vein about twice its own length distant from the mid. Scales shown in Fig. 4, Plate IV.

Length. 6.5 mm.

Habitat. Kenissa, White Nile and Middle Sobat.

Genus MIMOMYIA, Theobald.

Mono. Culicid. III., p. 304, 1903.

The female only has so far been described, and in general appearance it resembles a *Uranotania* but the larger fork-cells and narrow-curved scutellar scales will at once separate it.

Dr. Balfour sends a male which is described here, I feel sure it is the male of the new species recorded. It is one of the most curious mosquitoes I have seen. The proboscis is much swollen for half its length, the labellæ small, leaf like and acuminate and the palpi long and thin and acuminate, about two-thirds the length of the proboscis. The structure of the palpi would thus place it between the Culicinae and Aedinae.

Mimomyia uniformis, n. sp.
(Plate I., Figs. 7, 8, & 10)

Head brown with yellowish scales, thorax testaceous with small black scales. Abdomen brown with blackish-brown scales, the apical segments with scattered creamy scales. Legs uniformly brown, venter of femora pale. Wings with a pale spot at their base.



FIG. 5
Mimomyia uniformis ♂
Enlarged portion of wing to show scales

Female. Head brown, clothed with rather irregular flat creamy scales and some yellow and black upright-forked ones, the latter towards the nape; antennæ brown, basal joint testaceous darker on the inside, remainder deep brown; proboscis brown, swollen apically and the labellæ black; palpi small, testaceous, with black scales above.

Thorax shiny brown with scattered narrow-curved black scales; pleuræ testaceous; scutellum bright brown with black narrow-curved scales, four border-bristles to the mid lobe; metanotum chestnut-brown

with brown scales and with basal bands of dull creamy scales, so dull that they are only noticeable in certain lights, apical segments with a few scattered creamy scales; border-bristles dull golden.

Legs uniformly brown, except the venter of the femora, which are pale; in certain lights the legs show ochreous reflections. Wings with brown scales and with a nude shiny white basal patch, lateral scales on the apical portions of the veins and on the major area of the second and on one side of the fourth elongate, clavate, those on the basal parts of the second and fourth longer than the others; median vein-scales short and spatulate a single row only, those on the sixth somewhat longer than the rest; first submarginal cell about the same length and scarcely narrower than the second posterior cell, its base nearer the apex of the wing, its stem longer than the cell; stem of the second posterior about the length of the cell; supernumerary cross-vein slightly nearer the base of the wing than the mid cross-vein; posterior

cross-vein longer than the mid and about its own length distant from it; halteres with grey stem and black scaled knob.

Length. 2 mm.

Male. Proboscis (Fig. 6) brown, swollen from a little past the middle ventrally, apex truncated, labellæ leaf-like and acuminate, clothed with small brown scales. Palpi very thin and needle-like, about two-thirds the length of the proboscis, swollen at the base and clothed with small brown scales. Antennæ densely plumose, plume-hairs brown.

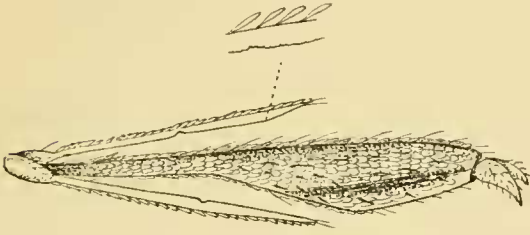


FIG. 6

Mimomyia uniformis, n. sp. ♂ proboscis

Legs brown, unbanded; fore and mid ungues simple, unequal; hind, small equal and simple. Wings (Plate I., Fig. 10), with similar scales to the female, but the lateral clavate ones rather shorter and broader (Fig. 5); the upper branch of the first submarginal cell rather close to the first long vein; first submarginal cell scarcely narrower but almost the same length as the second posterior cell, its stem as long as, or longer than, the cell, its base nearer the apex of the wing than that of the second posterior cell, stem of the latter as long as the cell; posterior cross-vein longer than the mid and about its own length distant from it, supernumerary and mid cross-veins united. Upper costal border with black spines.

Length. 2 mm.

Habitat. Lado (female); Bahr-El-Jebel (male).

Observations. Described from a single female and male. I feel almost sure the male belongs here as the general characters are so similar. It can at once be told from the two other African *Mimomyias* by the general brown hue. The female was partly denuded in transit, but some notes sent by Dr. Balfour complete the description.

Mimomyia splendens, Theobald

Mono. Culicid. III., p. 304 (1903)

Dr. Balfour records this very marked species from the Sudd country, Bahr-El-Jebel; the specimen being captured on the steamer. He has not sent me the specimen, but says apart from the features mentioned below, it entirely agrees with the type having apple-green scales on the thorax, etc.

The following differences are pointed out.—“The halteres of a fine lemon yellow; there is a thick scaling, almost tufting, at the apices of the tibiæ with metallic violet scales and metallic violet scales are scattered over the tibiæ and some on the coxæ.” These differences in colour are due probably to Dr. Balfour noting a fresh specimen, whilst mine was some months old. The only important character is the trace of tibial tufting, but if only slight it cannot be taken as a character sufficient to separate the specimen as a new species.

Genus URANOTENIA, Artibalzaga.

Dipt. Argentina, p. 63 (1899): Mono. Culicid. II., p. 241 (1901)

Uranotenia balfouri, n. sp.

(Plate VI., Fig. 6)

Head with a broad black median band, pale blue on each side. Thorax brown with pale blue pro-thoracic lobes and a pale blue area in front of the roots of the wings. Abdomen brown, unbanded. Legs brown unbanded. Wings with brown scales, except a short row at the base of the fifth long vein.

Female. Head black clothed in the middle with flat black scales forming a broad median area, sides clothed with flat pale blue scales; viewed in certain lights the back of the dark area of the head reflects deep rich blue colours; four prominent curved black bristles in front which project medianally and some short black ones between; antennæ deep brown with paler nodes, basal joint pale reddish-brown; clypeus pale reddish-brown; palpi black; proboscis black, nearly as long as the whole body.

Mesothorax brown with small narrow-curved brown scales, a short blue line on each side before the root of the wings; prothoracic lobes clothed with flat pale blue scales; scutellum brown, testaceous along the edge, lateral lobes with small flat black scales (mid lobe rubbed); four posterior border-bristles to the mid lobe; metanotum deep brown; pleuræ brown, with a small median patch of pale blue scales.

Abdomen deep brown with rich deep brown scales and pale golden border-bristles, on the sides of the last three or four apical segments are traces of basal brown scales; venter pale ochreous with brown border-bristles; legs deep brown, bases testaceous, venter of femora pale; ungues small equal, and simple; wings with brown scales except at the base of the fifth long vein where there is a row of broad flat white scales; costa and first long vein with very dark scales, long lanceolate and prominent lateral vein-scales on the second and third veins and a few on the fork of the fourth; the second long vein lying very close to the first, the upper branch of the small first submarginal cell being particularly closely applied; the stem of the first submarginal cell about two and a half times as long as the cell, that of the first posterior slightly longer; posterior cross-vein twice the length of the mid and about its own length distant from it; mid cross-vein much shorter than the supernumerary; the scales on the fifth (except base) are dark and also on the sixth except at the apex which is nude in the specimen examined; halteres with testaceous stem and black knob.

Length. 2 mm.

Habitat. Pibor.

Observations. Described from a nearly perfect female, the scutellum alone being damaged. Dr. Balfour states that it is "very common on the Pibor, and very annoying in the evening." It is a very small species that may easily get through ordinary mosquito netting.

It is closely related to *Uranotænia cæruleocephala*, Theobald (Mono. Culicid., Vol. II., p. 256), but can be told at once by the head having a broad area in the middle of flat black scales, and by the thoracic markings being blue instead of white.

Uranotænia cæruleocephala, Theobald

Mono. Culicid. II., p. 256, (1901), and III., p. 302 (1903)

A single female taken by Dr. Balfour on the Bahr-El-Jebel. It exactly resembles the type but small, lateral, white abdominal patches may be seen. It can at once be told from the former by the head being entirely pale blue. It has also been taken at Old Calabar, Gambia and Uganda.

A NEW GENUS AND NEW SPECIES.

The very curious male described here cannot be placed in any known genus, but without the female I prefer to leave it un-named.

Male. Proboscis black; labellæ paler; palpi brown (Fig. 7), a pale band on the lower side of centre; the apical joint, rather swollen and bent, covered with scales and a few bristles. Antennæ, plumose with a long terminal pilose segment. Head dark and small, eyes deep purplish-black; pale upright scales, not forked, over vertex and occiput; white flat scales on either side of a dark median line of scales, a few black scales on the nape. Thorax denuded, with traces of black and long golden hair-like scales; pleuræ brown with white patches.

Abdomen purplish-black with basal yellowish white bands to the segments, which expand laterally and spread on to the venter.

Legs with knee spot and long tibial bristles, pale tibio-metatarsal tufts and the three last hind tarsals pale yellow; posterior ungues much smaller than the others, all apparently equal and simple.



FIG. 7
Male palp and labellæ or a
new genus?

Length. 4 mm.

Habitat. Bahr-El-Jebel, North Sudd Country.

Observations.—Described from a single damaged male which I have mounted in balsam. It is most marked owing to the curious form of the palpi which separate it from all other Culicids I have seen, or that have been described. It may be a male of some genus already named; hence, until more specimens are obtained, I leave it unclassified.